

# **PUBLIC HAZARDS COMMUNICATION AND EDUCATION: THE STATE OF THE ART**

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## **WHY EDUCATE ABOUT HAZARDS?**

There are varied possible goals of public hazard education and/or communication. Most efforts have sought to accomplish one of them: simply comply with a mandate to distribute public education material, actually inform and educate people, alter people's opinion, and/or change people's behavior, e.g., get them to do something they wouldn't have otherwise done. Sadly, many public hazard education efforts have been conducted without considering the impact that the communication or education effort was to have on the public. Others have been designed with clear objectives in mind (cf. Mileti and Fitzpatrick 1991). Effective public education and communication campaigns seek clear objectives, and incorporate techniques to achieve those objectives. The purpose of this paper is to summarize what is known about the characteristics and techniques of effective public hazard education.

## **IMPORTANT THINGS TO KEEP IN MIND**

There are several topics on which readers of this document should be informed before reading the details of the topic at hand. These follow.

**Public Education and Warnings Should not be Confused.** Public hazard education is communicating general information to the public *independent* of the occurrence of any one specific hazardous event. On the other hand, warnings communicate information about a specific disaster in the days, hours, or minutes prior to impact. Although many of the principles known about how to effectively communicate hazard to the public apply to both education and warning, they are different (cf. Mileti and Sorensen 1990). There is also only a limited relationship between them. Public response to warnings is much more the result of the information that people have access to *during the warning period* than anything else, including pre-event public education. Prior public education can "prime" people for response in some future warning, for example, by educating people about the location of evacuation shelters.

**There's a Known Social Psychology of Hazard Education.** A lot is known about the fundamental character of human beings; how that character relates to hazards and emergencies (cf. Lindell and Perry 1992); and the how and why of what makes public education and communication for hazards work or fail (cf. Mileti and Fitzpatrick 1991). This knowledge transcends hazard type since people remain people regardless of the type of hazard or mitigation program they face. And recent interest has grown in transferring knowledge from other hazards to fire preparedness (cf. Rohrmann 1995).

From a theoretical viewpoint, public hazards communication and education works best when the public materials and approaches used bring about *uncertainty* in the minds of people, causing them to wonder about their environment, and to question their safety in it. Good public education gives people something to mull over and to discuss with friends, family, and colleagues. It sparks interest enough that people generate questions, and then seek more information to answer their questions, and its specialists are there with additional and clear information when the questions are asked (cf. Mileti and Fitzpatrick 1992). Despite all that, the desired changes in the public may take some time to materialize.

**Effective Hazard Education Is Ongoing--Not a Single Act.** Most successful public education campaigns about almost any hazard (natural or otherwise) follow the model described above: “Quit smoking”. “Fasten your seat belt”. “Don't litter”. Those famous campaigns all began by showing the risks or problems associated with particular behaviors. They all had three things going for them: (1) they raised questions (created uncertainty) in the minds of their audiences, (2) they offered fairly simple answers, and (3) they had authorities available over time who were able to provide additional information when people sought it and were able to reinforce the message.

Generous funding by one or more interest groups helped with the latter. An effective public education program posits a problem and then says how to solve it--over and over again. And, even though public education involves colorful pamphlets, eye-catching posters, and provocative public interest announcements on TV and radio, even more valuable is an understanding of the dynamics of human behavior, effective ways to change it, and a systematic approach to carrying it out over time.

**Good Hazard Education Takes People Factors Into Account.** To be sure, there is really no such thing as “a public”. There are actually different and diverse segments in any one public audience. These “sub-publics” are distinct from each other based on readily identified personal and social characteristics; and these characteristics make people more or less likely to be impacted by public hazards education. For example, previous experience with a hazard, higher levels of formal education, middle age, gender, ethnicity, and family connections are just a few of the “people factors” that can impact how people process and respond to hazards information (cf. Hoffman 1998; Perry and Nelson 1991). Here's one specific example from the many available in the research literature: A middle-aged person whose house was seriously damaged in a past disaster is likely to live in a house that he/she has made safer. On the other hand, youth and gender make people less likely to care about low probability high consequence events, or to take steps to increase their safety: most 20 year-old males are the least likely to do anything to protect themselves.

Sound public education doesn't change any of those “people factors”. Instead it takes them into account and even takes advantage of them in designing the delivered information such that almost everyone generates questions about risk, options, changed opinions, and actions. Good information about any hazard can prompt almost anyone to question their environment and search for more information: the first steps in the sometimes-long journey to changed opinions

and behavior about a particular hazard. Research into the social psychology of perception and belief indicates that--as counterintuitive as it may seem--perceived risk does not contribute directly to taking protective action (cf. Mileti and Fitzpatrick 1992).

**Perceiving Risk Doesn't Equal Doing Something About It.** Despite the inclination to think otherwise, most humans do not behave in accordance with their perceptions, attitudes, or behavioral intentions. For example, a person living close to a hazardous site may understand the risk from that site, but may not have done one thing to enhance their safety.

**Probability Estimates Really Aren't that Important.** Nor do people think in probabilities. Typically, the human thought process about future events is pretty binary: it will happen/it won't happen; it will affect me/it won't affect me (cf. Mileti, Fitzpatrick and Farhar 1992). The fancy probability estimates that scientists and engineers love to generate for future hazardous events won't change that. Nevertheless, elaborate efforts to educate U.S. publics about the relative probabilities of events continue even though they don't really make a difference. Some examples: the odds of a repeat of a Three Mile Island-type nuclear power plant accident, the statistical probabilities associated with hurricane landfalls, or the odds of a great quake on the southern and northern sections of the San Andreas fault. Engineers, scientists, and statisticians continue to be frustrated because public risk perception does not follow from their objective definitions of risk, and because public action is often inconsistent with ever-refined scientific probabilities. The public does take in probability estimates, but those estimates are added to other more important pieces of information, such as beliefs, recent experiences, preferences, political points of view, and many other factors to determine risk perception. The end result is binary: is this something to worry about/do something about or not?

**People Have to Think It's Their Own Idea.** Public educators have learned through trial and error what parents of teenagers already know: people are generally not motivated by sermons on why they ought to do something, or why they ought to accept the actions of others. Neither moral exhortations nor discourses on ethical or legal imperatives produce the desired opinion or behavior change in the average citizen. People are more apt to follow an appropriate agenda if they work out a solution or come to a conclusion themselves, with helpful information from specialists (cf. Mileti and Darlington 1997). Not surprisingly, most people are more apt to change their opinion or behavior, or accept a local action, when they think their own idea created the need to change.

## **"LAWS" OF EFFECTIVE PUBLIC HAZARD EDUCATION**

Much research has been done, in numerous disciplines, in reference to many different kinds of hazards, regarding communicating hazard information to the public. The research record contains over relevant 300 publications produced over a half-century. Almost every natural hazard and most human-made hazards have been investigated. Public response to communicated warnings--short, intermediate, and long-term--and general education efforts have been investigated. This elaborate research record documents dozens of factors that influence the effectiveness of public hazard communication. One clear conclusion from the record is that our understanding of how to effectively communicate hazards to people transcends hazard type:

people remain people regardless of the hazard type being investigated.

But it was during the mid-to-late 1980's and early 1990's that breakthrough research was performed that distinguished which of the many factors in the research record were of major versus lesser importance. The breakthrough findings were then tested in a large field experiment on the public in a major U.S. population center, and the findings were confirmed. Some of the conclusions of this more recent research have been elevated to "immutable laws" of effective public education about hazards. These principles should be included in any state-of-the-art public education campaign (cf. Mileti, Fitzpatrick and Farhar 1992).

**Be Clear.** Complicated phenomena must be clearly explained in non-technical terms. Experts generally can't accomplish this, so hire people that have communication skills to work with experts to craft the words that you'll give to the public.

**Use Varied Sources.** Information must come from various relevant sources including authorities, technical experts and scientists and engineers (if applicable), and from people familiar to locals. Multiple sources can author the same communication and/or the same communication can come from multiple sources or, better yet, use both approaches.

**Render Information Consistent and Repeat It.** The information people receive should be consistent, changes from the past should be explained, and repeated frequently through many different media and disseminated through varied networks such as neighborhood networks, community associations or the media.

**Use a Stream of Communications.** Messages on TV and radio are effective, but what works best is an information stream of many communications through diverse media and over time that includes a written document, mid-stream, direct mailed to people's homes.

**Tell People What to Do.** Despite what physical scientists and technical experts think, the most important information that you can give to people is to tell people what they can do before, during, and after an event.

**Support People in Their Search for More Information.** The first thing that you can count on people doing--if the educational effort is working--is for them to talk it over with others and to seek out more information. Expect it. Encourage it. Support it.

**Use Words and Great Graphics.** Clear information works best, so use simple language, but support the language with graphics, and present them attractively.

**Position Additional Information in the Community.** People always search out more information on their own to validate and "confirm" what they've already gotten. So position the kind of additional information that people will look for in the community in the places that people will look for it and tell them where they can find it.

## **OTHER IMPORTANT THINGS THAT HELP**

There are also other important lessons that have been learned about public hazard education that works. These items are not yet “laws”, but they are important to add to the “laws” listed above and to use.

**Partnerships Work Best.** Partnerships work better than if only one organization disseminates the information. High-profile organizations in the area with an established track record are important to include in the partnership.

**Feature Specialists.** Education programs are more effective if they feature specialists who are experts in the area of hazard that your education program is about.

**Adapt Material to Locals.** The information that you present should be adapted and customized to your constituents. For example, if the population(s) you seek to educate have a disaster in local memory, reference it in your materials; or if there are significant numbers who only read special newspapers, be sure to add those newspapers to your public education campaign to communicate with those people.

**Use Different Ways to Communicate.** Many good means exist to communicate with a public. Use as many as you can. For example, the grocery bag or mass mailing approaches are a great way to communicate. But they alone are not sufficient. The more numerous and diverse ways that you use to communicate with the public, the better. Be innovative in selecting many diverse ways to reach people, for example, add children coming home from school with coloring books on your topic to obvious radio and TV spots.

**Tailor Information for Special Groups.** It is a mistake to assume that any public is homogeneous: public information should be tailored to the different special groups in an area. For example, an effective approach to deliver information and materials for middle-class homeowners will be different from those who might live in a communal farm in the hills above town; and those for schools will not be like those for large corporations.

**Use Multiple Languages.** Public hazard education efforts that have been conducted in multiple languages have worked better than those that have just used one language.

**Use a Good Mix of the Verbal and the Visual.** The right mix of verbal and visual ways to communicate with the public works best. Finding the right mix of verbal and visual information about a risk and what the public should think and do about it is not always easy, but it increases the success of public hazards education.

## **THE “GOLDEN RULE”: USE WINDOWS OF OPPORTUNITY**

Both empirical research and seasoned observation support the golden rule of public education for hazards: *all the sophisticated materials and behavior modification techniques do not have the force of one good disaster to change both what people think, their behavior, and even public policy, at least in the short-term.* During the well-known "window of opportunity" that opens following a disaster, abundant information from various sources in the affected locale will increase the chances for changing what people think and their behavior. This is also the case for people and communities that were not directly impacted by that disaster but, “experienced” it over the media.

However, while people are more apt to alter behaviors after a disaster strikes, change after a disaster is most likely when public educators have already worked to make sure the problem is recognized, the solution is known, and some advocates are already in place. Do not wait for the window to open; build a sustained advocacy program beforehand. Not working constantly may result in waiting forever.

Take advantage of a window opening someplace else. Use it while you can, for the window is not open long! The fleeting interest wanes. A public policy maker's memory and attention are even shorter than the public's. Typically, even after a big disaster, he or she will not keep that hazard high on the list of big issues for more than two or three months.

## **USING WHAT’S KNOW TO CRAFT THE IDEAL MESSAGE**

Below are suggestions for successful public education about hazards that use the knowledge just presented. First the ideal message is explained, and then ways of delivering it are recommended. The items covered are not in descending order of importance; each is important, although some have greater importance than others (cf. Mileti and Sorensen 1990).

**Use Simple Language.** Translate and manipulate information about the hazard in order to make it accessible. Reading in the newspaper the technically sophisticated and generally incomprehensible statements of scientists, engineers, or actuaries will not give most people an elementary understanding of the hazard and likely impacts on their lives. Simple language in manageable amounts is absolutely necessary. Though credentialed spokespersons are one of the most important sources of information, specialists who speak only in the jargon of their discipline will not be effective. Authoritative interpreters of technical information should be cultivated, encouraged, and paid well. Fit the specialist to the topic, for example: scientists should talk about science, engineers and architects should talk about structures, and firefighters and emergency responders should talk about home safety.

**Keep the Information Consistent.** Since most people are exposed to information through a number of media and from various sources, have your information frequently repeated over diverse communication modes and keep it consistent. Inconsistent information confuses people and allows them to discount some or all of it. Educators should partner and work together,

across jurisdictions and organizations, to see that their messages are similar. For example, numerous organizations--state agencies, the Red Cross, school authorities, and media outlets should work together and come up with a common public message.

**Package Information for the Media.** One of the hallmarks of an effective public education program is plenty of material on hand when the TV and radio stations start calling and the feature writer from the paper shows up looking for the local angle. Prepare media packets that cover the full list of topics the media might be interested in finding out about, use verbal and visual ways to present the information, and say it in clear and understandable language.

**Cover Three Critical Topics.** The message presented to the public should clearly explain three critical issues: 1) potential losses, 2) the chances that the losses will take place in a certain amount of time, and 3) how to cut the losses. This can be thought of as the tripod on which good hazards public education rests. Without any one of the three legs, an initiative could teeter and ultimately fail.

**Describe Potential Losses.** Generally, people can't imagine the impact a hazard could have on their community, their house, or their place of work, so they must be assisted by descriptions of the hazard, pictures, scenarios, or computer-based maps. The essence of this task is working to overcome the almost universal human tendencies to conclude that it can't happen here or it won't happen to me. The more relevant the description can be to the situation of the audience, the more likely it is that they will attend to it. A good educator can find "the local angle" in any hazard or disaster--even in a far-off land--and work it.

**Discuss the Odds About When the Losses Will Take Place.** Once people understand that it could, indeed, happen here, they must be further convinced that it may happen to them: in the next 10 years, the lifetime of their mortgage, or during their watch. Although almost no one but mathematicians and professional gamblers really understands odds, most people will want to know the likelihood of a hazard occurring in their neighborhood in an uncomplicated sort of way and in a smallish number of years. Probability estimates will not, in themselves, accomplish much with the public, but the information will assist in creating the uncertainty that is so important to changing people's opinions about a hazard and their behavior.

**Explain How to Cut Losses.** A person with a clear picture of his or her possible losses must quickly be offered suggestions and directions for how to reduce them. Without these blueprints, people can fall prey to a fatalistic inertia. Appropriate assistance may take many forms: a how-to video for homeowners; evacuation guidelines for a school; a business resumption planning process for a corporation or a city government; encouragement and help from a neighborhood emergency response team; or recommended policy changes for a water system. People can be guided to change their opinions and what they do to deal with future risk in endless ways.

**Say Who's at Risk.** Specify who could be at risk in a future event and who could not for both education and planning purposes. For example, if we were talking about earthquakes, explaining the relative weaknesses of various building types--unbolted wood frame, un-

reinforced masonry, non-ductile concrete, multi-unit apartments with tuck-under parking--will help people understand they might be injured if they live or work in them. Such information will also help emergency planners anticipate response needs. Beyond physical effects, people should be helped to recognize that they would be economically damaged, socially isolated, psychologically troubled, and just plain inconvenienced. Detail the exact impacts of the disaster on all groups in the community, on utilities, on transportation systems, and on governmental and non-profit organizations responsible for public health and well-being.

**Embrace Uncertainty.** Be clear about the lack of certainty, if any, in predicting the incidence and effects of a hazard. Any scenario of a future event is a best guess. Overstating or understating the risk or inflating or deflating the probability of a future hazardous event inoculates people against belief just as surely as inconsistency. Predictions of catastrophe strike some people as too extreme to be credible; they terrify others. Neither group will be likely to accept the information as deserving of further questioning or attention. More than one public education project has painted too dire or safe a picture and compromised its credibility.

## **USING WHAT'S KNOWN TO DELIVER THE MESSAGE**

Public education that works is a complicated process--on both the delivery and receiving ends. Campaigns must be coherent and collaborative, their information must be credible and understandable, and the information must reach its intended audience. In that statement is a prescription for close cooperation among technical specialists and educators, constant communication among educational organizations, and sophistication and creativity in the message translators and communicators (cf. Mileti and Sorensen 1990).

**Use an Information Stream and Include a Written Brochure.** The most effective way to educate the public is by using a written brochure (cf. Mileti, Fitzpatrick and Farhar 1992). A written document gives people something to refer to, as they become more interested in the topic. The most effective way to get the brochure to people is to mail it to their homes. Doing so helps people to personalize the risk. If insufficient funding does not permit a mailing, publish a special insert in newspapers. It is best if the brochure comes from official government sources and others, including scientists.

The brochure should explain specifically, what the risk is; where the risk exists geographically and where it does not exist; when the event is likely to happen; what the effects will be; what people should do before, during, and after the event; and where to get additional information. The information in the brochure should be as clear as possible. Probabilities should be supplemented with the certainty provided by stating that the officials and scientists are convinced that the odds of the event happening/not happening are high enough/low enough that they recommend public action/no action.

The distribution of a brochure is not enough, however, and it must be supplemented. The public must be primed before the brochure is distributed so that the topic is sufficiently salient for them to keep it when it arrives. Furthermore, the public must receive additional information



after the brochure arrives to be enticed to read it. This additional information should come from as many different sources and through as many different channels as possible. It is this additional information that makes the mailed brochure effective. Clearly, the media should be provided with consistent supplemental information before and after the brochure is disseminated.

People need multiple information sources to reinforce the risk information in the brochure. People who see neighbors, friends, and relatives preparing for the hazard is also useful reinforcement. Visible demonstration projects in the communities that are targets for public action could also be very helpful.

This information flow should capture people's attention, spark their interest, and make them begin to consider taking action to mitigate the risk. They need to discuss the risk at local organizations, seek out additional information on their own, and talk with friends and neighbors about it. This process permits people to gather information and form their own ideas about the level of risk and what they should do about it. People need to feel that taking some protective action is their own idea, but information "ownership" takes time. Preparedness and mitigation actions result from the whole process, not merely receiving a mailed brochure. However, supplemental information must be available in the local community for use during this process. Information channels may include coloring books in schools, other brochures, slide shows, filmstrips, and additional advice on emergency plans and mitigation actions.

**Line-up Multiple Sources of Information.** It is easiest for people to attend to information if it comes from a group or a person they trust. Depending on age, education, class, and ethnicity, different people trust different sources. Some people want to hear about earthquakes from seismologists at the U.S. Geological Survey and about a problem at a nuclear power plant from a nuclear engineer who helps run it; others believe only what the Red Cross tells them; still others search for data sources online. It's important to use various sources to reach all groups in the community. Having multiple sources author single communications or having the same communication come from multiple sources, or both, works (cf. Blanchard-Boehm 1998).

**Address a Diverse Public.** Assume that your public is diverse; tailor information to the needs of each group (cf. Vaughan 1995; Wolfe 1993; Perry and Nelson 1991). For example, the elderly have special needs, so create materials for them that speak to those needs. Don't ignore non-English speakers; write information in their languages or get your materials translated by knowledgeable local speakers of those languages. Some cultural groups choose not to read for information for reasons unrelated to literacy; to reach them, use radio and TV, word-of-mouth, or pictographic images. Use the media that serve multilingual populations. Special populations may require special communications, for example, people in the tourist industry (cf. Drabek 1994).

**Use Multiple Media.** Now that we've had the information technology revolution, the sky's the limit. You can bounce a fact about hazard risk off satellites, insinuate it into electronic data networks, feature it on interactive computer games, add it to distance learning curricula, and project it onto the screen of the nearby theater. Vary your spokes-persons as well: today, the Red Cross spokesperson on radio; tomorrow, cartoon characters on TV; next week, a scientist on the

Internet. Effective public education programs should have the staff to constantly work the media angles and maintain contact with media personalities.

**Use Media Appropriate to the Audience.** The Internet is indeed a marvelous tool, but everyone doesn't use it. For example, text that can be downloaded from your web page is not the way to reach a non-English-speaking or low-income audience. Information for those groups can be disseminated through the community organizations and social service agencies that regularly work with that audience. Conversely, technologically sophisticated packaging gets middle-class, computer-using audiences where they live.

**Make the Information Easy to Get.** If public education is provided on an ongoing basis, successful public education works to change people's opinions about a hazard and to motivate people to do something to reduce risk. This happens when your educational efforts gets the public interested enough in the topic to talk it over with others and to reach out for additional information. You must not frustrate your public! Have information ready and accessible at the time someone is motivated to ask for it. In many cases, the wheel has already been invented. Share materials. Revise them. Adapt them. Translate them.

**Use an Incremental Approach.** Because learning is incremental, information dissemination should be, too. Organize the information you present to highlight related themes successively. For example, some education organizations or emergency services agencies distribute to participating communities monthly newsletters with reproducible masters on different aspects of emergency preparedness. In January, the spotlight is on home safety; in February, it moves to planning a family evacuation route.

**Make your Approach Interactive and Experiential.** We know that adults learn by comparing new information to what they already know, by thinking through and discussing the new concept or practice, and by doing. They don't sit passively and digest everything they hear or read. They do not enjoy lectures. Use models, visual aids, fancy media, and peer group discussions. Engage your audience; don't preach.

**Use Other Disasters as Learning Opportunities.** Send elected officials, government functionaries, corporate officials, school superintendents, various professionals, and community organizers to view emergency response to other disasters in other places. Have them report the lessons they derive for their community, business, school district, or practice. Such people typically return from their reconnaissance with better vision and a more active imagination than they had before they left. They have seen the truth and can communicate it to many others. They are motivated to do something, and can frequently infect others with their commitment.

**Individuals Can Make a Big Difference.** Never overlook the role of an individual in changing what the public thinks and does. There are many examples of hazard champions who single-handedly prod and cajole their organizations, schools, neighborhoods, or governments regarding hazards. These individuals are both tenacious in their efforts to stimulate change and

passionate in their belief that change is necessary. Finding, cultivating, and motivating such an individual can sometimes be the key to a successful public education campaign.

## **EVALUATE YOUR PROGRAM**

Build some sort of evaluation component into your education campaign for yourself and for others such as a survey that can give you valuable information in determining how effective your campaign was. When you assess the efficacy of your materials and approaches, you can revise what doesn't work or emphasize what does. Share that knowledge with other educators, so campaigns across the country can benefit from your experience. Last, but not least, use your data to justify continued and increased financial support.

## **THE BEST PUBLIC HAZARD EDUCATION IS ONGOING**

If your organization funds a public education program, continue that support over many years. If you run a public education program, keep it highly visible and recognizable in the community. Programs that deliver helpful information over the years see their credibility and effectiveness grow. Don't decrease it by altering missions, or by changing logos or names. Be patient, and understand that good public education is a long haul.

## **WHAT SOME FEDERAL AGENCIES HAVE TO OFFER**

The National Disaster Education Coalition is a group of federal agencies and non-profit organizations that support common goals in disaster and hazards education. This group worked hard with the nation's leading social scientists in this area to produce a state-of-the-art guide for public risk education. The group developed a standardized guide on hazards safety messages, providing information that all organizations agreed on for national use. The guide covers many different hazards, as well as general preparedness issues. It is in the public domain and can be used by anyone. It is available from any local Red Cross chapter, or can be downloaded from <http://www.redcross.org/disaster/safety/guide.html>

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